

VI. RISK-ADJUSTED HOSPITAL MORTALITY RATES FOR 1997-1998

In the 1997-1998 CCMRP data set used to develop the risk-adjustment model, a total of 802 patients of 30,814 died in-hospital following the isolated CABG procedure. This results in an overall in-hospital mortality rate of 2.6%. In contrast, the New York State Department of Health reported an in-hospital mortality rate of 2.15% for New York hospitals For 1998 (see www.health.state.ny.us).

The logistic regression model in the previous section (see Table 4) was used to develop risk-adjusted mortality statistics for each of the participating hospitals. Risk adjusting hospital mortality rates allows a fair comparison across hospitals by controlling for differences in patient case-mix. Specifically, the risk-adjustment model calculates the *expected number* of in-hospital deaths for isolated CABG patients in each hospital, and the *expected mortality rate* for each hospital.

The tables and graphics that follow provide two important pieces of information about each hospital's performance:

The observed to expected mortality ratio (O/E ratio): The O/E ratio is the *number of observed (actual) deaths* for the hospital, divided by the *number of expected deaths* for the hospital (as determined from the risk-adjustment model). If the O/E ratio is higher than 1.0, it means that the hospital had more deaths than would have been expected given the case-mix of its patients. If the number is lower than 1.0, it means that the hospital had fewer deaths than would have been expected given the case-mix of its patients. **Small differences in the O/E ratio are usually not significant.** Hospitals that have O/E ratios of less than or greater than one are not classified as better or worse than expected unless the result has also been found to be statistically significant.

Classification into a rating category (better than expected/worse than expected/no different than expected): The performance category a hospital falls into is dependent on the hospital's observed death rate in relation to the *95% confidence interval* around the *expected death rate*. Specifically, statistical significance of a hospital's result is determined by the following:

- If the *observed death rate* is higher than the upper bound of the 95% confidence interval of the *expected death rate*, then the hospital's performance is classified as worse than expected.
- If the *observed death rate* is lower than the lower bound of the 95% confidence interval of the *expected death rate*, then the hospital's performance is classified as better than expected.

This comparison of the *observed mortality rate* to the confidence interval around the *expected mortality rate* is a test of statistical significance. An *observed rate* outside the 95% confidence interval of the *expected rate*, indicates with reasonable confidence that the hospital's performance is either better or worse than expected.

A series of tables (Tables 5 and 6) and figures (Figures 2 and 3) present the risk-adjusted results for the 79 CCMRP-participating hospitals for the 1997 and 1998 data submission period. Tables 5 and 6 present detailed numerical results, first displayed alphabetically by hospital and then displayed in ascending order of each hospital's O/E Ratio. The figures that follow present the results graphically, sorted alphabetically by overall performance rating and by geographic region.

It is critical to recognize that, regardless of any individual hospital's performance results, participation in CCMRP represents a significant commitment to quality measurement and improvement by each participating hospital. It is equally important to note that the overall performance rating—that is whether the hospital performed differently than expected—may have been different if data from the 38 non-participating hospitals were included.

How to Read Tables 5 and 6

Number of CABG cases submitted: This column denotes the number of isolated CABG cases the hospital submitted to CCMRP for the 1997–1998 period. Some hospitals began submitting data in 1997, while others began in 1998. Whatever the starting date, we combined all data from all participating hospitals to construct the 1997–1998 risk adjustment model. The total number of cases from the 79 hospitals that publicly report their results is 28,597. The 1997–1998 data set used to compute the risk model includes data from 82 hospitals, representing 30,814 cases.

Number of observed deaths: This is the *actual* number of in-hospital deaths the hospital submitted to CCMRP for isolated CABG patients during the 1997–1998 period. This number does not include patients who died after transfer or discharge from the facility. There were 802 in-hospital deaths in our 1997–1998 data set.

Number of expected deaths: CCMRP used the risk-adjustment model to calculate the probability of in-hospital death for each one of the 30,814 cases in the 1997–1998 data set. CCMRP staff then summed the probabilities for all cases at any one hospital to calculate the number of in-hospital deaths we would expect at the hospital given its case-mix. For example, if Hospital X had 150 patients, 100 of whom had a 1% probability of death, 40 of whom had a 4% probability of death, and 10 with a 9% probability of death, the total number of expected deaths would be 3.5 (i.e., $(100)(1\%) + (40)(4\%) + (10)(9\%) = 1 + 1.6 + 0.9 = 3.5$ expected deaths). Note that the *number of expected deaths* can be a fractional number, unlike the *number of observed deaths*—which can only be a whole number.

The O/E ratio: Dividing the *observed death rate* by the *expected death rate* produces the O/E ratio. This ratio is a quick method for assessing hospital performance. If the hospital had fewer actual deaths than expected, the O/E ratio will be less than 1.0. If the hospital had more deaths than expected, the O/E ratio will be greater than 1.0. If, as in the previous example, the *observed death rate* was 2.8% while the *expected death rate* was 3.28%, the hospital's O/E ratio would be $2.8\%/3.28\% = 0.854$.

Observed death rate: This is the actual death rate for the hospital. It is calculated by dividing the *number of observed deaths* for the hospital by the *number of cases* for the hospital in the

1997–1998 period. For example, if the hospital had 250 isolated CABG cases in 1997–1998, with seven actual in-hospital deaths, the observed death rate would be $7/250 = 2.8\%$.

Expected death rate: The *number of expected deaths* is divided by the *number of cases* to derive the *expected death rate*. If the hospital had 250 isolated CABG cases in 1997–1998 and an expected number of in-hospital deaths of 8.2, the *expected death rate* would be $8.2/250 = 3.28\%$. Note that the *expected death rate* is a measure of the average severity of illness of each hospital's isolated CABG patients: the higher the expected rate, the higher the average severity. The average death rate for the entire 1997–1998 data set is $802/30,814 = 2.60\%$, so if the *expected death rate* is higher than 2.6% the hospital's isolated CABG patients tend to be higher risk than the overall population of CABG patients in CCMRP's data set.

The lower and upper confidence intervals on the expected death rate: Assuming that the risk adjustment model is correct, we can calculate the standard deviation for the *number of expected deaths* at each hospital. Because there is a great deal of variability in patient risks, the CCMRP model calculates the standard deviation based on the predictions of risk for each patient rather than using the average risk over all patients at each hospital. A lower confidence limit bound on the *expected rate* is computed by subtracting twice the standard deviation from the *expected rate*. Similarly the upper bound is calculated by adding twice the standard deviation to the *expected rate*. Two standard deviations (2SD) below and above the *expected rate* is an approximate 95% confidence interval.

In general, if the upper and lower bounds of the *expected death rate* are close together, the expected rate is fairly reliably estimated. The width of the confidence interval depends both on the number of cases that a hospital submitted, and the variability of the difference in the risks for the hospital's isolated CABG patients. A hospital that had more cases to CCMRP will tend to have a narrower confidence interval than a hospital that had less, which provides a more reliable idea of its overall performance.

Overall performance rating: The hospital's overall performance rating is based on a comparison of each facility's *observed death rate* to the 95% confidence interval around the hospital's *expected death rate*. This is a test of statistical significance. Effectively, hospitals are only classified as "better" or "worse" than expected if their *observed mortality rate* falls outside the 95% confidence interval of the *expected death rate*. CCMRP splits all hospitals into three groups, "better than expected," "worse than expected," and "no different than expected." For ease of reading, a blank in this column indicates a hospital's actual performance is *no different than expected*.

Better than Expected ★	Hospital's observed mortality rate is:	Less than	Lower confidence interval of expected mortality rate
Worse than Expected ▼	Hospital's observed mortality rate is:	Greater than	Upper confidence interval of expected mortality rate
No Different than Expected	Hospital's observed mortality rate:	Falls within	Upper and lower confidence interval of expected mortality rate

Table 5: Risk-Adjusted Results for CCMRP Hospitals, 1997–1998, Sorted Alphabetically

Name	Total CABG Cases Submitted	Number of Observed Deaths	Number of Expected Deaths	O/E Ratio	Observed Death Rate	Lower 95% CI of Expected Death Rate	Expected Death Rate	Upper 95% CI of Expected Death Rate	Overall Performance Rating (blank = no different than expected)
ALTA BATES MEDICAL CENTER	276	11	7.29	1.51	3.99	0.83	2.64	4.46	
ALVARADO HOSPITAL MEDICAL CENTER	298	16	10.71	1.49	5.37	1.51	3.59	5.68	
ANAHEIM MEMORIAL MEDICAL CENTER	130	4	3.08	1.30	3.08	0.00	2.37	4.89	
CALIFORNIA PAC MED CTR—PACIFIC CAMPUS	176	6	3.47	1.73	3.41	0.00	1.97	4.03	
CEDARS-SINAI MEDICAL CENTER	868	19	21.54	0.88	2.19	1.46	2.48	3.50	
CITRUS VALLEY MEDICAL CENTER—IC CAMPUS	430	16	14.35	1.12	3.72	1.65	3.34	5.03	
COMMUNITY MEM HOSP—SAN BUENAVENTURA	202	4	3.81	1.05	1.98	0.00	1.89	3.78	
DAMERON HOSPITAL	107	3	3.97	0.76	2.80	0.30	3.71	7.11	
DANIEL FREEMAN MEMORIAL HOSPITAL	173	2	3.86	0.52	1.16	0.01	2.23	4.44	
DESERT REGIONAL MEDICAL CENTER	122	5	2.91	1.72	4.10	0.00	2.39	5.12	
DOCTORS MEDICAL CENTER—SAN PABLO	169	3	7.28	0.41	1.78	1.42	4.31	7.21	
DOCTORS MEDICAL CENTER—MODESTO	451	11	8.22	1.34	2.44	0.57	1.82	3.07	
DOMINICAN SANTA CRUZ HOSPITAL—SOQUEL	272	10	7.84	1.28	3.68	0.98	2.88	4.79	
DOWNNEY COMMUNITY HOSPITAL ▼	239	13	6.53	1.99	5.44	0.72	2.73	4.75	Worse than Expected
EL CAMINO HOSPITAL	52	1	2.14	0.47	1.92	0.00	4.11	8.96	
ENCINO TARZANA REGIONAL MEDICAL CENTER	145	2	7.17	0.28	1.38	1.36	4.94	8.53	
GLENDALE ADVENTIST MEDICAL CENTER	203	7	6.35	1.10	3.45	0.83	3.13	5.43	
GLENDALE MEM HOSPITAL AND HEALTH CTR	223	8	10.98	0.73	3.59	2.13	4.92	7.72	
GRANADA HILLS COMMUNITY HOSPITAL	142	4	2.13	1.88	2.82	0.00	1.50	3.52	
HOAG MEMORIAL HOSPITAL PRESBYTERIAN ★	496	9	17.98	0.50	1.81	2.03	3.63	5.22	Better than Expected
JOHN MUIR MEDICAL CENTER ▼	128	9	2.97	3.03	7.03	0.00	2.32	4.91	Worse than Expected
KAISER FOUNDATION HOSP—GEARY (S.F.)	992	21	18.58	1.13	2.12	1.05	1.87	2.69	
KAISER FOUNDATION HOSP—SUNSET (L.A.)	2302	31	37.66	0.82	1.35	1.12	1.64	2.15	
KAWEAH DELTA DISTRICT HOSPITAL	562	9	16.51	0.55	1.60	1.59	2.94	4.28	
LANCASTER COMMUNITY HOSPITAL	23	0	0.76	0.00	0.00	0.00	3.31	9.49	
LITTLE COMPANY OF MARY HOSPITAL	160	4	3.84	1.04	2.50	0.03	2.40	4.77	

★ Better than expected mortality rate, ▼ Worse than expected mortality rate.

Table 5: Risk-Adjusted Results for CCMRP Hospitals, 1997–1998, Sorted Alphabetically (cont.)

Name	Total CABG Cases Submitted	Number of Observed Deaths	Number of Expected Deaths	O/E Ratio	Observed Death Rate	Lower 95% CI of Expected Death Rate	Expected Death Rate	Upper 95% CI of Expected Death Rate	Overall Performance Rating (blank = no different than expected)
LONG BEACH MEMORIAL MEDICAL CENTER	378	7	12.01	0.58	1.85	1.42	3.18	4.93	
LOS ANGELES CO USC MEDICAL CENTER	146	4	2.87	1.39	2.74	0.00	1.96	4.20	
MARIN GENERAL HOSPITAL	94	2	1.74	1.15	2.13	0.00	1.85	4.59	
MEDICAL CENTER AT THE UCSF	141	7	3.95	1.77	4.96	0.29	2.80	5.30	
MEMORIAL HOSPITAL MODESTO	550	16	11.55	1.39	2.91	0.89	2.10	3.31	
MERCY GENERAL HOSPITAL	2565	32	38.37	0.83	1.25	1.03	1.50	1.97	
MERCY MEDICAL CENTER—REDDING	114	3	5.49	0.55	2.63	1.05	4.82	8.58	
MERCY SAN JUAN HOSPITAL ▼	408	17	7.92	2.15	4.17	0.60	1.94	3.28	Worse than Expected
METHODIST HOSPITAL OF SOUTHERN CAL	428	17	14.26	1.19	3.97	1.64	3.33	5.02	
MILLS—PENINSULA MEDICAL CENTER	323	14	8.92	1.57	4.33	1.04	2.76	4.48	
MT DIABLO MEDICAL CENTER	561	20	15.91	1.26	3.57	1.49	2.84	4.18	
NORTHridge HOSPITAL MEDICAL CENTER	301	9	8.91	1.01	2.99	1.04	2.96	4.88	
PALOMAR MEDICAL CENTER	349	13	11.08	1.17	3.72	1.40	3.18	4.95	
POIMONA VALLEY HOSPITAL MEDICAL CENTER	527	18	13.11	1.37	3.42	1.19	2.49	3.79	
PRESBYTERIAN INTERCOMMUNITY HOSPITAL ▼	117	9	4.55	1.98	7.69	0.69	3.89	7.08	Worse than Expected
PROVIDENCE HOLY CROSS MEDICAL CENTER	114	3	2.70	1.11	2.63	0.00	2.37	5.19	
PROVIDENCE SAINT JOSEPH MEDICAL CENTER	232	3	3.74	0.80	1.29	0.00	1.61	3.25	
REDDING MEDICAL CENTER	1037	14	16.22	0.86	1.35	0.81	1.56	2.32	
RIVERSIDE COMMUNITY HOSPITAL	86	7	4.57	1.53	8.14	1.00	5.32	9.64	
SADDLEBACK MEMORIAL MEDICAL CENTER	175	9	8.03	1.12	5.14	1.52	4.59	7.66	
SALINAS VALLEY MEMORIAL HOSPITAL	135	2	3.88	0.52	1.48	0.08	2.87	5.67	
SAN ANTONIO COMMUNITY HOSPITAL	124	3	7.56	0.40	2.42	2.25	6.10	9.94	
SANTA BARBARA COTTAGE HOSPITAL	267	9	6.75	1.33	3.37	0.65	2.53	4.41	
SANTA MONICA—UCLA MEDICAL CENTER	45	2	1.25	1.60	4.44	0.00	2.78	7.64	
SCRIPPS MEMORIAL HOSPITAL—LA JOLLA	674	15	19.92	0.75	2.23	1.74	2.96	4.17	

★ Better than expected mortality rate, ▼ Worse than expected mortality rate.

Table 5: Risk-Adjusted Results for CCMRP Hospitals, 1997–1998, Sorted Alphabetically (cont.)

Name	Total CABG Cases Submitted	Number of Observed Deaths	Number of Expected Deaths	O/E Ratio	Lower 95% CI of			Upper 95% CI of			Overall Performance Rating (blank = no different than expected)
					Observed Death Rate	Expected Death Rate	Death Rate	Observed Death Rate	Expected Death Rate	Death Rate	
SEQUOIA HOSPITAL	483	18	21.36	0.84	3.73	2.67	4.42	6.18			
SETON MEDICAL CENTER	1249	18	22.21	0.81	1.44	1.04	1.78	2.52			
SHARP CHULA VISTA MEDICAL CENTER	531	23	18.94	1.21	4.33	2.01	3.57	5.12			
SHARP GROSSMONT HOSPITAL	133	1	2.34	0.43	0.75	0.00	1.76	4.02			
SHARP MEMORIAL HOSPITAL	304	4	5.24	0.76	1.32	0.25	1.73	3.20			
ST. BERNARDINE MEDICAL CENTER	405	11	14.40	0.76	2.72	1.76	3.56	5.35			
ST. FRANCIS MEDICAL CENTER	62	3	3.39	0.89	4.84	0.00	5.46	11.00			
ST. HELENA HOSPITAL & HEALTH CENTER	419	8	11.27	0.71	1.91	1.15	2.69	4.23			
ST. JOHN'S HOSPITAL—SANTA MONICA	256	5	6.80	0.74	1.95	0.72	2.66	4.60			
ST. JOHN'S REGIONAL MED CENTER—OXNARD	90	2	2.91	.69	2.22	0.00	3.24	6.84			
ST. JOSEPH HOSPITAL—ORANGE	293	8	6.57	1.22	2.73	0.54	2.24	3.94			
ST. JOSEPH'S MEDICAL CENTER OF STOCKTON	610	20	17.31	1.16	3.28	1.55	2.84	4.13			
ST. JUDE MEDICAL CENTER	205	8	5.13	1.56	3.90	0.40	2.50	4.61			
ST. MARY MEDICAL CENTER—LONG BEACH	87	7	5.82	1.20	8.05	1.60	6.69	11.78			
ST. VINCENT MEDICAL CENTER	74	2	2.14	0.93	2.70	0.00	2.89	6.65			
STANFORD UNIVERSITY HOSPITAL	269	10	6.23	1.61	3.72	0.51	2.31	4.12			
SUMMIT MEDICAL CENTER ★	325	5	11.85	0.42	1.54	1.73	3.65	5.57			Better than Expected
SUTTER MEMORIAL HOSPITAL ★	1534	25	42.71	0.59	1.63	1.99	2.78	3.58			Better than Expected
THE HEART HOSPITAL, INC.	133	1	3.58	0.28	0.75	0.00	2.69	5.39			
TORRANCE MEMORIAL MEDICAL CENTER	401	20	16.72	1.20	4.99	2.33	4.17	6.01			
TRI-CITY MEDICAL CENTER	431	7	10.31	0.68	1.62	0.97	2.39	3.82			
UCLA MEDICAL CENTER	191	7	6.10	1.15	3.66	0.81	3.19	5.57			
UC SAN DIEGO UNIVERSITY MEDICAL CENTER (THORNTON AND HILLCREST)	191	9	7.39	1.22	4.71	1.17	3.87	6.57			
UCSF/MT ZION	44	2	1.40	1.43	4.55	0.00	3.18	8.40			
UNIVERSITY OF CALIFORNIA DAVIS MED CTR	74	2	1.62	1.23	2.70	0.00	2.19	5.52			

★ Better than expected mortality rate, ▼ Worse than expected mortality rate.

Table 5: Risk-Adjusted Results for CCMRP Hospitals, 1997–1998, Sorted Alphabetically (cont.)

Name	Total CABG Cases Submitted	Number of		O/E Ratio	Observed Death Rate	Lower 95% CI of Expected Death Rate		Expected Death Rate	Upper 95% CI of Expected Death Rate		Overall Performance Rating (blank = no different than expected)
		Observed Deaths	Expected Deaths			Expected Death Rate	Observed Death Rate		Expected Death Rate	Observed Death Rate	
UNIVERSITY OF CALIFORNIA IRVINE MED CTR	94	0	3.13	0.00	0.00	0.00	0.00	3.33	6.89		
USC UNIVERSITY HOSPITAL	144	4	2.74	1.46	2.78	0.00		1.90	4.15		
WASHINGTON HOSPITAL—FREMONT	334	14	17.07	0.82	4.19	2.92		5.11	7.30		

★ Better than expected mortality rate, ▼ Worse than expected mortality rate.

Table 6: Risk-Adjusted Results for CCMRP Hospitals, 1997-1998, Sorted by O/E Ratio

Name	Total CABG Cases Submitted	Number of Observed Deaths	Number of Expected Deaths	O/E Ratio	Observed Death Rate	Lower 95% CI of Expected Death Rate	Expected Death Rate	Upper 95% CI of Expected Death Rate	Overall Performance Rating (blank = no different than expected)
LANCASTER COMMUNITY HOSPITAL	23	0	0.76	0.00	0.00	0.00	3.31	9.49	
UNIVERSITY OF CALIFORNIA IRVINE MED CTR	94	0	3.13	0.00	0.00	0.00	3.33	6.89	
ENCINO TARZANA REGIONAL MEDICAL CENTER	145	2	7.17	0.28	1.38	1.36	4.94	8.53	
THE HEART HOSPITAL, INC.	133	1	3.58	0.28	0.75	0.00	2.69	5.39	
SAN ANTONIO COMMUNITY HOSPITAL	124	3	7.56	0.40	2.42	2.25	6.10	9.94	
DOCTORS MEDICAL CENTER—SAN PABLO	169	3	7.28	0.41	1.78	1.42	4.31	7.21	
SUMMIT MEDICAL CENTER ★	325	5	11.85	0.42	1.54	1.73	3.65	5.57	Better than Expected
SHARP GROSSMONT HOSPITAL	133	1	2.34	0.43	0.75	0.00	1.76	4.02	
EL CAMINO HOSPITAL	52	1	2.14	0.47	1.92	0.00	4.11	8.96	
HOAG MEMORIAL HOSPITAL PRESBYTERIAN ★	496	9	17.98	0.50	1.81	2.03	3.63	5.22	Better than Expected
SALINAS VALLEY MEMORIAL HOSPITAL	135	2	3.88	0.52	1.48	0.08	2.87	5.67	
DANIEL FREEMAN MEMORIAL HOSPITAL	173	2	3.86	0.52	1.16	0.01	2.23	4.44	
KAWEAH DELTA DISTRICT HOSPITAL	562	9	16.51	0.55	1.60	1.59	2.94	4.28	
MERCY MEDICAL CENTER—REDDING	114	3	5.49	0.55	2.63	1.05	4.82	8.58	
LONG BEACH MEMORIAL MEDICAL CENTER	378	7	12.01	0.58	1.85	1.42	3.18	4.93	
SUTTER MEMORIAL HOSPITAL ★	1534	25	42.71	0.59	1.63	1.99	2.78	3.58	Better than Expected
TRI-CITY MEDICAL CENTER	431	7	10.31	0.68	1.62	0.97	2.39	3.82	
ST. JOHN'S REGIONAL MED CENTER—OXNARD	90	2	2.91	0.69	2.22	0.00	3.24	6.84	
ST. HELENA HOSPITAL & HEALTH CENTER	419	8	11.27	0.71	1.91	1.15	2.69	4.23	
GLENDALE MEM HOSPITAL & HEALTH CTR	223	8	10.98	0.73	3.59	2.13	4.92	7.72	
ST. JOHN'S HOSPITAL—SANTA MONICA	256	5	6.80	0.74	1.95	0.72	2.66	4.60	
SCRIPPS MEMORIAL HOSPITAL—LA JOLLA	674	15	19.92	0.75	2.23	1.74	2.96	4.17	
DAMERON HOSPITAL	107	3	3.97	0.76	2.80	0.30	3.71	7.11	
SHARP MEMORIAL HOSPITAL	304	4	5.24	0.76	1.32	0.25	1.73	3.20	
ST. BERNARDINE MEDICAL CENTER	405	11	14.40	0.76	2.72	1.76	3.56	5.35	

★ Better than expected mortality rate, ▼ Worse than expected mortality rate.

Table 6: Risk-Adjusted Results for CCMRP Hospitals, 1997–1998, Sorted by O/E Ratio (cont.)

Name	Total CABG Cases Submitted	Number of Observed Deaths	Number of Expected Deaths	O/E Ratio	Observed Death Rate	Lower 95% CI of Expected Death Rate	Expected Death Rate	Upper 95% CI of Expected Death Rate	Overall Performance Rating (blank = no different than expected)
PROVIDENCE SAINT JOSEPH MEDICAL CENTER	232	3	3.74	0.80	1.29	0.00	1.61	3.25	
SETON MEDICAL CENTER	1249	18	22.21	0.81	1.44	1.04	1.78	2.52	
WASHINGTON HOSPITAL—FREMONT	334	14	17.07	0.82	4.19	2.92	5.11	7.30	
KAISER FOUNDATION HOSP—SUNSET (L.A.)	2302	31	37.66	0.82	1.35	1.12	1.64	2.15	
MERCY GENERAL HOSPITAL	2565	32	38.37	0.83	1.25	1.03	1.50	1.97	
SEQUOIA HOSPITAL	483	18	21.36	0.84	3.73	2.67	4.42	6.18	
REDDING MEDICAL CENTER	1037	14	16.22	0.86	1.35	0.81	1.56	2.32	
CEDARS—SINAI MEDICAL CENTER	868	19	21.54	0.88	2.19	1.46	2.48	3.50	
ST. FRANCIS MEDICAL CENTER	62	3	3.39	0.89	4.84	0.00	5.46	11.00	
ST. VINCENT MEDICAL CENTER	74	2	2.14	0.93	2.70	0.00	2.89	6.65	
NORTHridge HOSPITAL MEDICAL CENTER	301	9	8.91	1.01	2.99	1.04	2.96	4.88	
LITTLE COMPANY OF MARY HOSPITAL	160	4	3.84	1.04	2.50	0.03	2.40	4.77	
COMMUNITY MEM HOSP—SAN BUENAVENTURA	202	4	3.81	1.05	1.98	0.00	1.89	3.78	
GLENDALE ADVENTIST MEDICAL CENTER	203	7	6.35	1.10	3.45	0.83	3.13	5.43	
PROVIDENCE HOLY CROSS MEDICAL CENTER	114	3	2.70	1.11	2.63	0.00	2.37	5.19	
CITRUS VALLEY MEDICAL CENTER—IC CAMPUS	430	16	14.35	1.12	3.72	1.65	3.34	5.03	
SADDLEBACK MEMORIAL MEDICAL CENTER	175	9	8.03	1.12	5.14	1.52	4.59	7.66	
KAISER FOUNDATION HOSP—GEARY (S.F.)	992	21	18.58	1.13	2.12	1.05	1.87	2.69	
UCLA MEDICAL CENTER	191	7	6.10	1.15	3.66	0.81	3.19	5.57	
MARIN GENERAL HOSPITAL	94	2	1.74	1.15	2.13	0.00	1.85	4.59	
ST. JOSEPH'S MEDICAL CENTER OF STOCKTON	610	20	17.31	1.16	3.28	1.55	2.84	4.13	
PALOMAR MEDICAL CENTER	349	13	11.08	1.17	3.72	1.40	3.18	4.95	
METHODIST HOSPITAL OF SOUTHERN CAL	428	17	14.26	1.19	3.97	1.64	3.33	5.02	
TORRANCE MEMORIAL MEDICAL CENTER	401	20	16.72	1.20	4.99	2.33	4.17	6.01	
ST. MARY MEDICAL CENTER—LONG BEACH	87	7	5.82	1.20	8.05	1.60	6.69	11.78	

★ Better than expected mortality rate, ▼ Worse than expected mortality rate.

Table 6: Risk-Adjusted Results for CCMRP Hospitals, 1997–1998, Sorted by O/E Ratio (cont.)

Name	Total CABG Cases Submitted	Number of Observed Deaths	Number of Expected Deaths	O/E Ratio	Observed Death Rate	Lower 95% CI of Expected Death Rate	Expected Death Rate	Upper 95% CI of Expected Death Rate	Overall Performance Rating (blank = no different than expected)
SHARP CHULA VISTA MEDICAL CENTER	531	23	18.94	1.21	4.33	2.01	3.57	5.12	
UC SAN DIEGO UNIVERSITY MEDICAL CENTER (THORTON AND HILLCREST)	191	9	7.39	1.22	4.71	1.17	3.87	6.57	
ST. JOSEPH HOSPITAL—ORANGE	293	8	6.57	1.22	2.73	0.54	2.24	3.94	
UNIVERSITY OF CALIFORNIA DAVIS MED CTR	74	2	1.62	1.23	2.70	0.00	2.19	5.52	
MT DIABLO MEDICAL CENTER	561	20	15.91	1.26	3.57	1.49	2.84	4.18	
DOMINICAN SANTA CRUZ HOSPITAL—SOQUEL	272	10	7.84	1.28	3.68	0.98	2.88	4.79	
ANAHEIM MEMORIAL MEDICAL CENTER	130	4	3.08	1.30	3.08	0.00	2.37	4.89	
SANTA BARBARA COTTAGE HOSPITAL	267	9	6.75	1.33	3.37	0.65	2.53	4.41	
DOCTORS MEDICAL CENTER MODESTO	451	11	8.22	1.34	2.44	0.57	1.82	3.07	
POMONA VALLEY HOSPITAL MEDICAL CENTER	527	18	13.11	1.37	3.42	1.19	2.49	3.79	
MEMORIAL HOSPITAL MODESTO	550	16	11.55	1.39	2.91	0.89	2.10	3.31	
LOS ANGELES CO USC MEDICAL CENTER	146	4	2.87	1.39	2.74	0.00	1.96	4.20	
UCSF/MT ZION	44	2	1.40	1.43	4.55	0.00	3.18	8.40	
USC UNIVERSITY HOSPITAL	144	4	2.74	1.46	2.78	0.00	1.90	4.15	
ALVARADO HOSPITAL MEDICAL CENTER	298	16	10.71	1.49	5.37	1.51	3.59	5.68	
ALTA BATES MEDICAL CENTER	276	11	7.29	1.51	3.99	0.83	2.64	4.46	
RIVERSIDE COMMUNITY HOSPITAL	86	7	4.57	1.53	8.14	1.00	5.32	9.64	
ST. JUDE MEDICAL CENTER	205	8	5.13	1.56	3.90	0.40	2.50	4.61	
MILLS-PENINSULA MEDICAL CENTER	323	14	8.92	1.57	4.33	1.04	2.76	4.48	
SANTA MONICA—UCLA MEDICAL CENTER	45	2	1.25	1.60	4.44	0.00	2.78	7.64	
STANFORD UNIVERSITY HOSPITAL	269	10	6.23	1.61	3.72	0.51	2.31	4.12	
DESERT REGIONAL MEDICAL CENTER	122	5	2.91	1.72	4.10	0.00	2.39	5.12	
CALIFORNIA PAC MED CTR—PACIFIC CAMPUS	176	6	3.47	1.73	3.41	0.00	1.97	4.03	
MEDICAL CENTER AT THE UCSF	141	7	3.95	1.77	4.96	0.29	2.80	5.30	
GRANADA HILLS COMMUNITY HOSPITAL	142	4	2.13	1.88	2.82	0.00	1.50	3.52	

★ Better than expected mortality rate, ▼ Worse than expected mortality rate.

Table 6: Risk-Adjusted Results for CCMRP Hospitals, 1997–1998, Sorted by O/E Ratio (cont.)

Name	Total CABG Cases Submitted	Number of		O/E Ratio	Observed		Lower 95% CI of		Upper 95% CI of		Overall Performance Rating (blank = no different than expected)
		Observed Deaths	Expected Deaths		Death Rate	Death Rate	Expected Death Rate	Expected Death Rate			
PRESBYTERIAN INTERCOMMUNITY HOSPITAL ▼	117	9	4.55	1.98	7.69	0.69	3.89	7.08	Worse than Expected		
DOWNNEY COMMUNITY HOSPITAL ▼	239	13	6.53	1.99	5.44	0.72	2.73	4.75	Worse than Expected		
MERCY SAN JUAN HOSPITAL ▼	408	17	7.92	2.15	4.17	0.60	1.94	3.28	Worse than Expected		
JOHN MUIR MEDICAL CENTER ▼	128	9	2.97	3.03	7.03	0.00	2.32	4.91	Worse than Expected		

★ Better than expected mortality rate, ▼ Worse than expected mortality rate.

How to Read Figures 2 and 3

The O/E ratio: Dividing the *observed death rate* by the *expected death rate* produces the O/E ratio. If the hospital had fewer actual deaths than expected, the O/E ratio will be less than 1.0. If the hospital had more deaths than expected, the O/E ratio will be greater than 1.0.

Observed mortality rate: This is the actual death rate for the hospital. It is calculated by dividing the *number of observed deaths* for the hospital by the *number of cases* for the hospital in the 1997–1998 period.

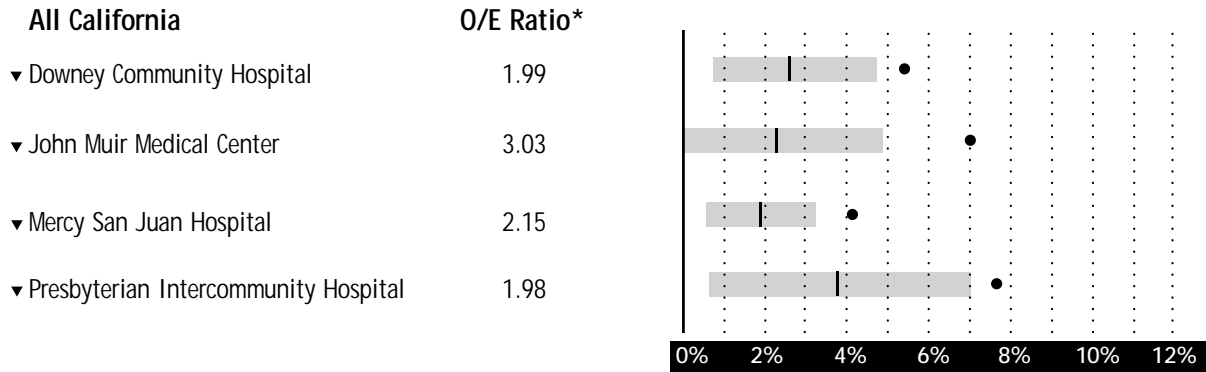
The range of the expected mortality rate: The expected death rate is the *number of expected deaths* divided by the *number of cases*. CCMRP staff calculated the standard deviation for the *number of expected deaths* at each hospital. Because there is a great deal of variability in patient risks, it calculates the standard deviation based on the predictions of risk for each patient rather than using the average risk over all patients at each hospital. The box on the graph represents the 95% confidence interval around the *expected mortality rate*. A lower confidence limit bound on the *expected rate* is computed by subtracting twice the standard deviation from the *expected rate*. Similarly the upper bound is calculated by adding twice the standard deviation to the *expected rate*. Two standard deviations (2SD) below and above the *expected rate* is an approximate 95% confidence interval. In general, when the upper and lower bounds of the *expected death rate* are close together, that means that the expected rate is fairly reliably estimated. The width of the confidence interval depends both on the number of cases that a hospital submitted, and the variability of the difference in the risks for the hospital's isolated CABG patients. A hospital that submitted many cases to CCMRP will tend to have a narrower confidence interval than a hospital that did not, which provides a more reliable idea of its overall performance.

Overall performance rating: The hospital's overall rating is based on a comparison of each facility's *observed mortality rate* to the 95% confidence interval around the hospital's *expected mortality rate*. This is a test of statistical significance. Effectively, hospitals are only classified as "better" or "worse" than expected if their *observed mortality rate* falls outside the 95% confidence interval of the *expected mortality rate*.

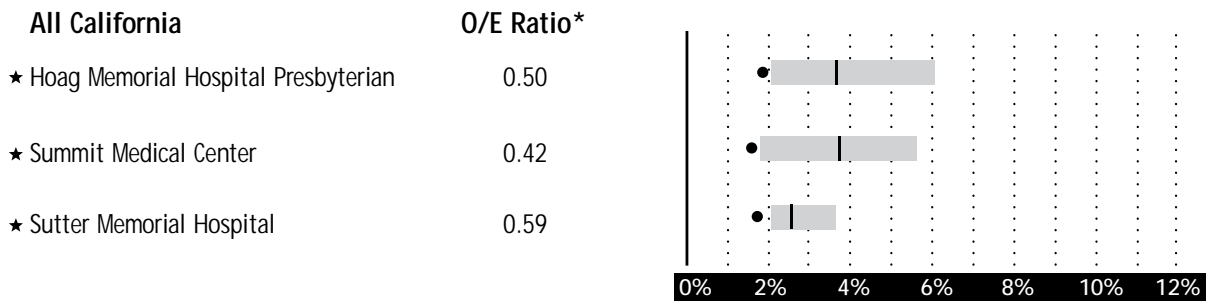
Better than Expected ★	Hospital's observed mortality rate is:	Less than	Lower confidence interval of expected mortality rate
Worse than Expected ▼	Hospital's observed mortality rate is:	Greater than	Upper confidence interval of expected mortality rate
No Different than Expected	Hospital's observed mortality rate:	Falls within	Upper and lower confidence interval of expected mortality rate

Figure 2 COMPARISON OF OBSERVED TO EXPECTED MORTALITY RATE, 1997 – 1998
(in Alphabetical Order by Performance Rating)

Hospitals Performing Worse than Expected



Hospitals Performing Better than Expected



- Observed Mortality Rate
- | Expected Mortality Rate
- Range of Expected Mortality Rate (95% Confidence Level)

- ▼ Observed Mortality Rate Significantly Worse than Expected
- ★ Observed Mortality Rate Significantly Better than Expected

*Observed to Expected Events Ratio

Figure 2

(cont.)

COMPARISON OF OBSERVED TO EXPECTED MORTALITY RATE, 1997 – 1998
(in Alphabetical Order by Performance Rating)
Hospitals Performing No Different Than Expected

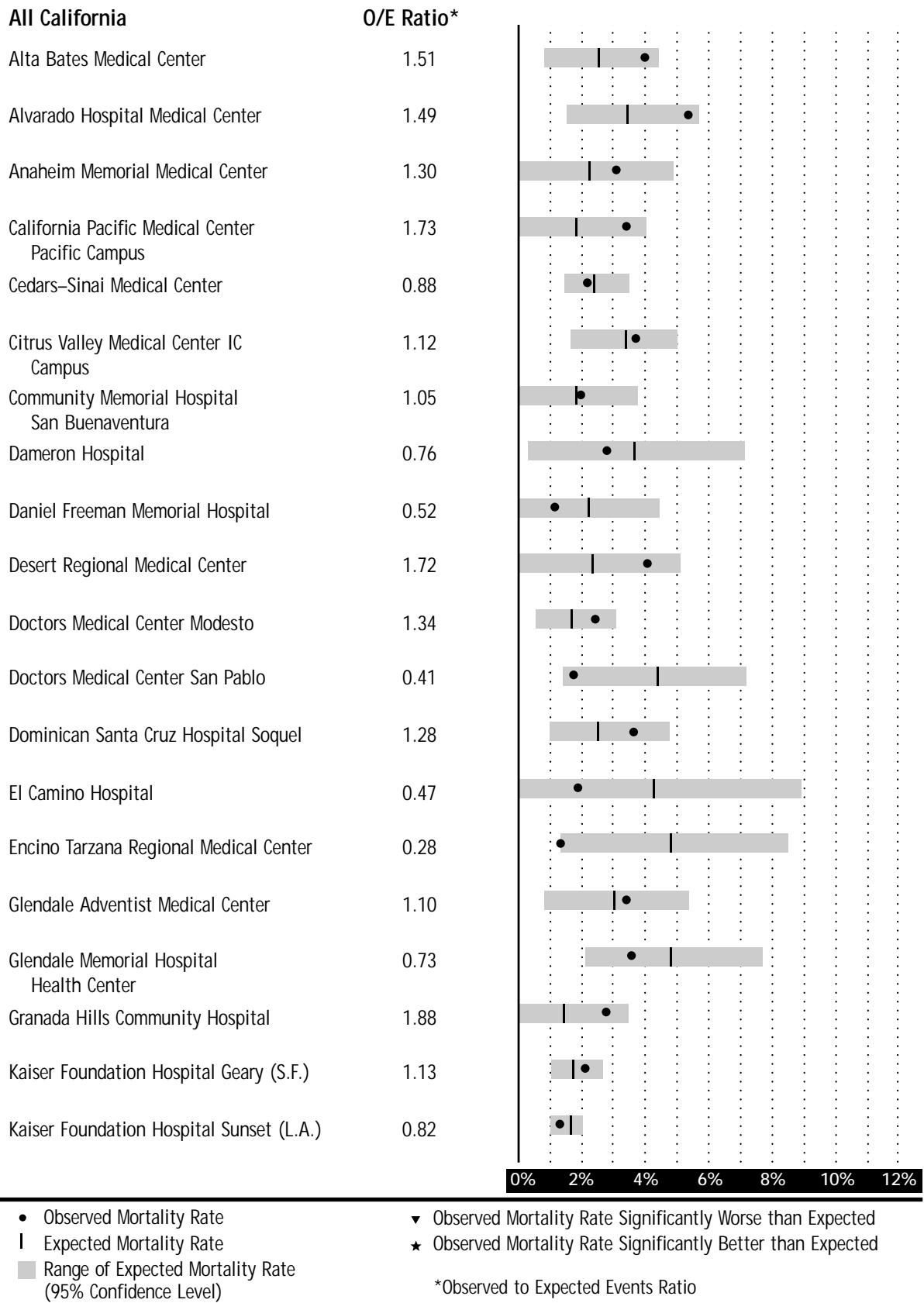


Figure 2 COMPARISON OF OBSERVED TO EXPECTED MORTALITY RATE, 1997 – 1998
(in Alphabetical Order by Performance Rating)
Hospitals Performing No Different Than Expected

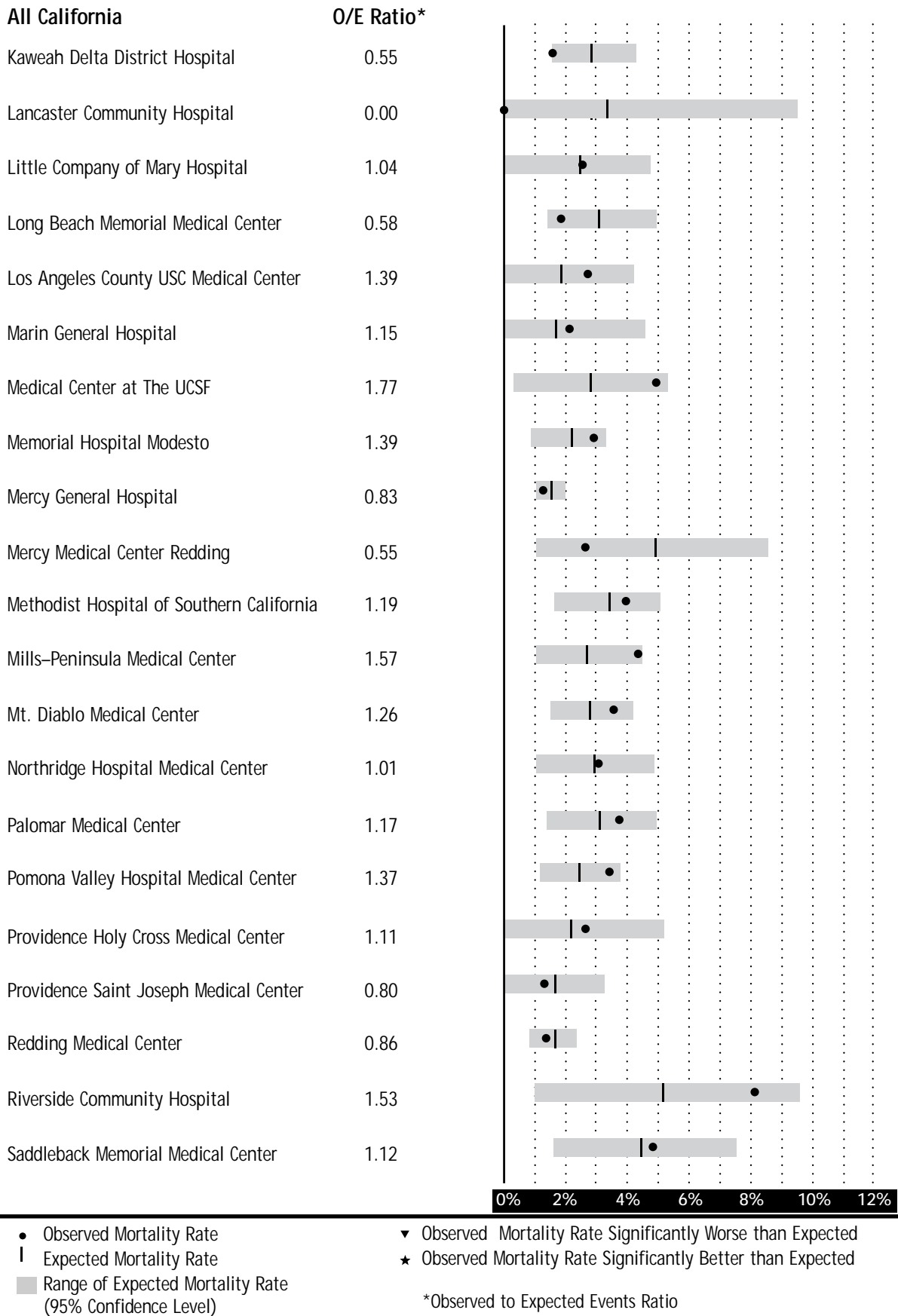


Figure 2 COMPARISON OF OBSERVED TO EXPECTED MORTALITY RATE, 1997 – 1998
(in Alphabetical Order by Performance Rating)
Hospitals Performing No Different Than Expected

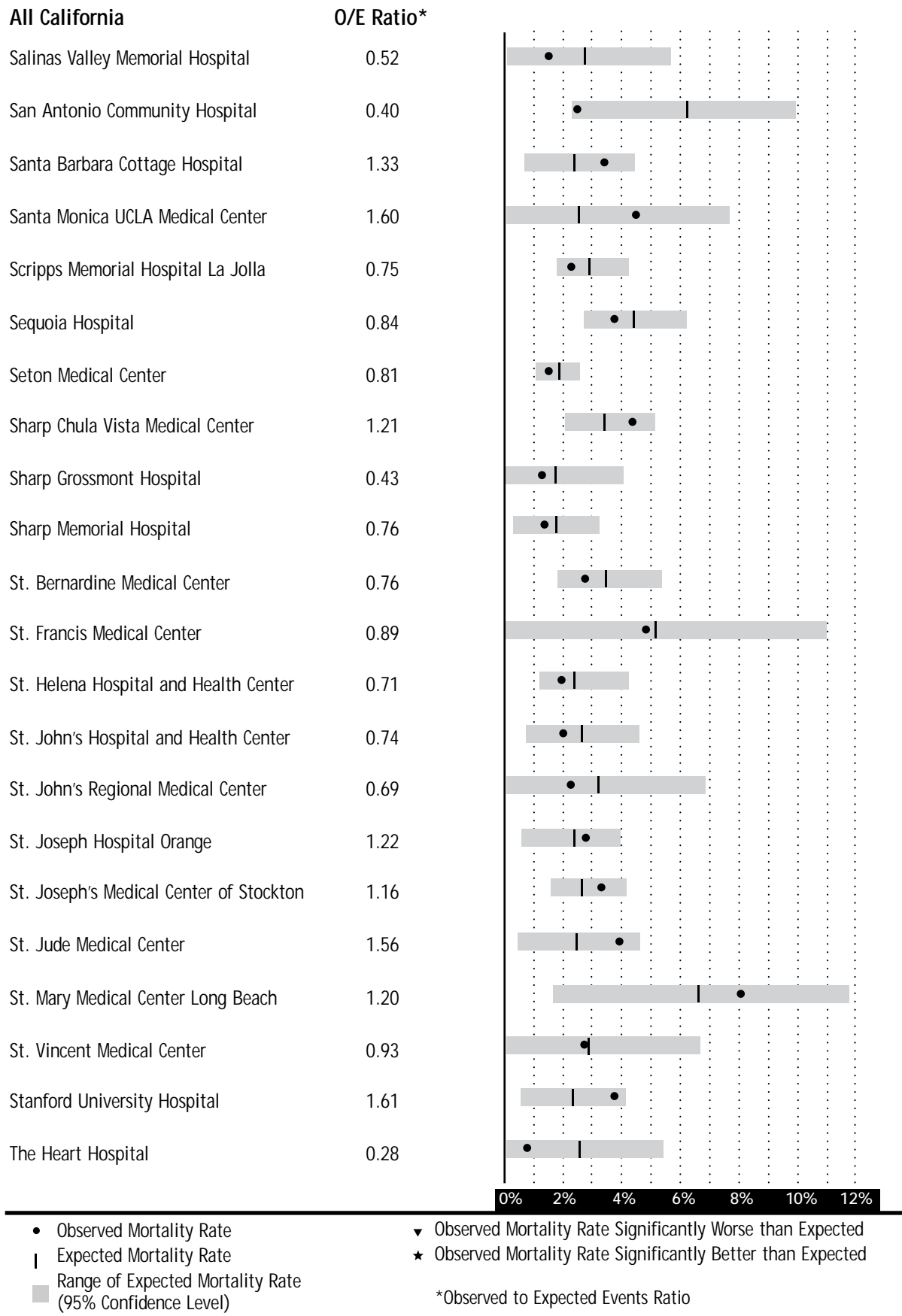


Figure 2

(cont.)

COMPARISON OF OBSERVED TO EXPECTED MORTALITY RATE, 1997 – 1998
(in Alphabetical Order by Performance Rating)
Hospitals Performing No Different Than Expected

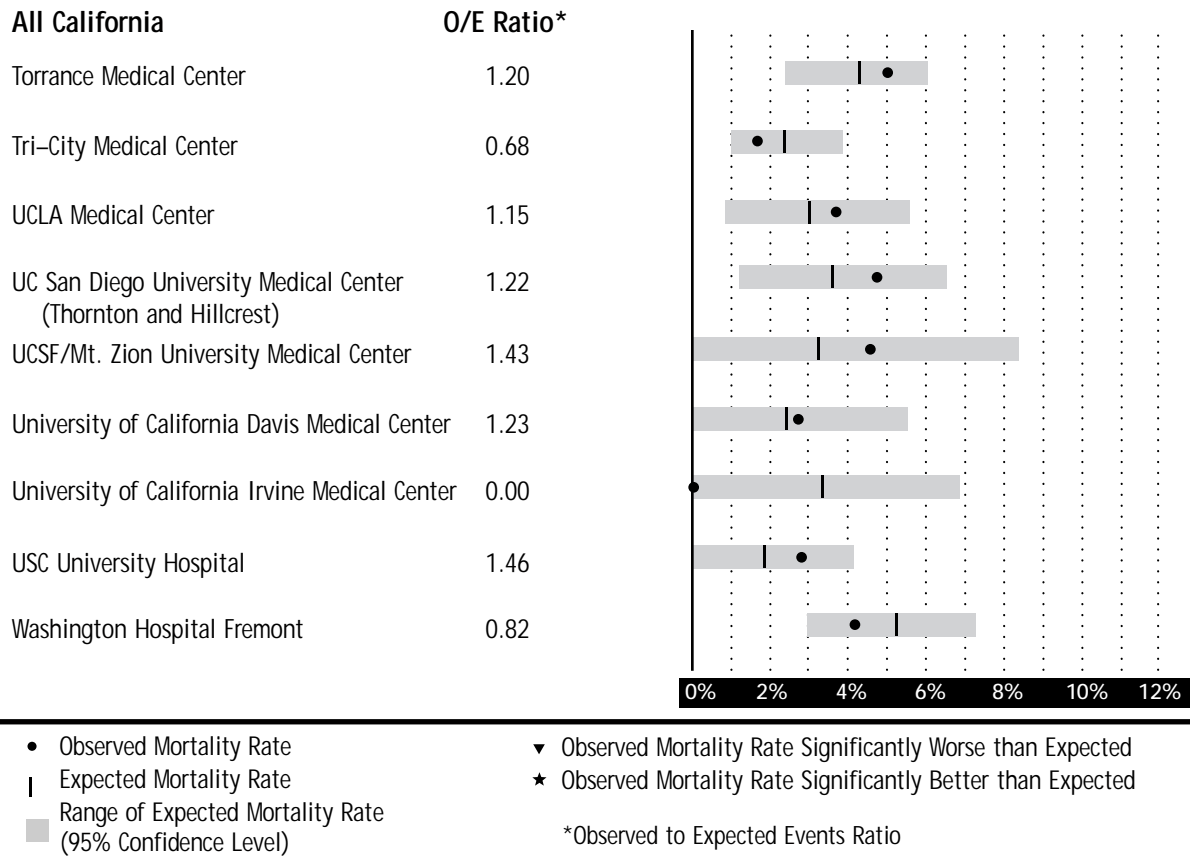
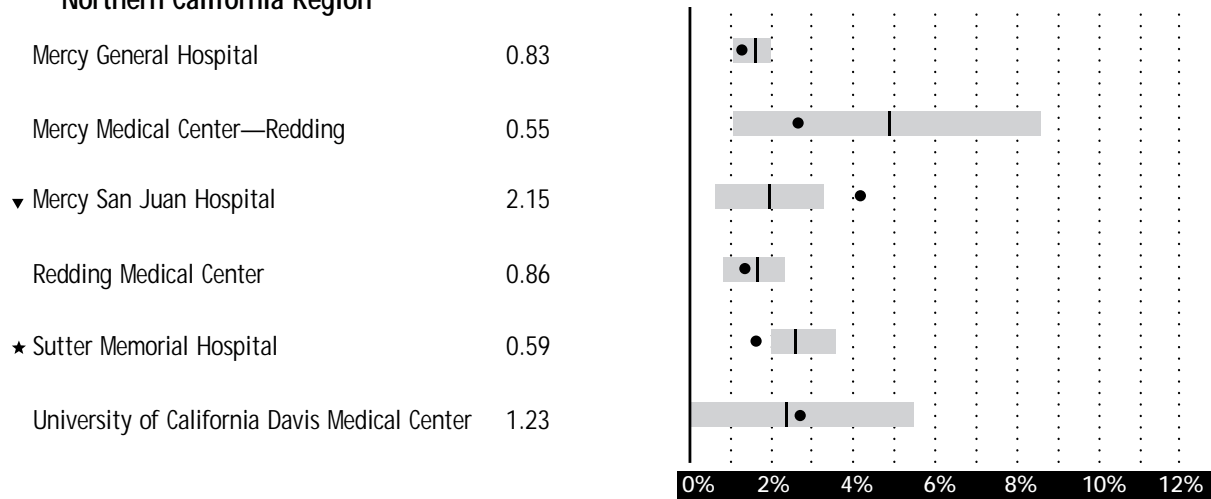


Figure 3

COMPARISON OF OBSERVED TO EXPECTED MORTALITY RATE, 1997 – 1998
(in Alphabetical Order by Geographic Region)

**Sacramento Valley and
Northern California Region**

O/E Ratio*



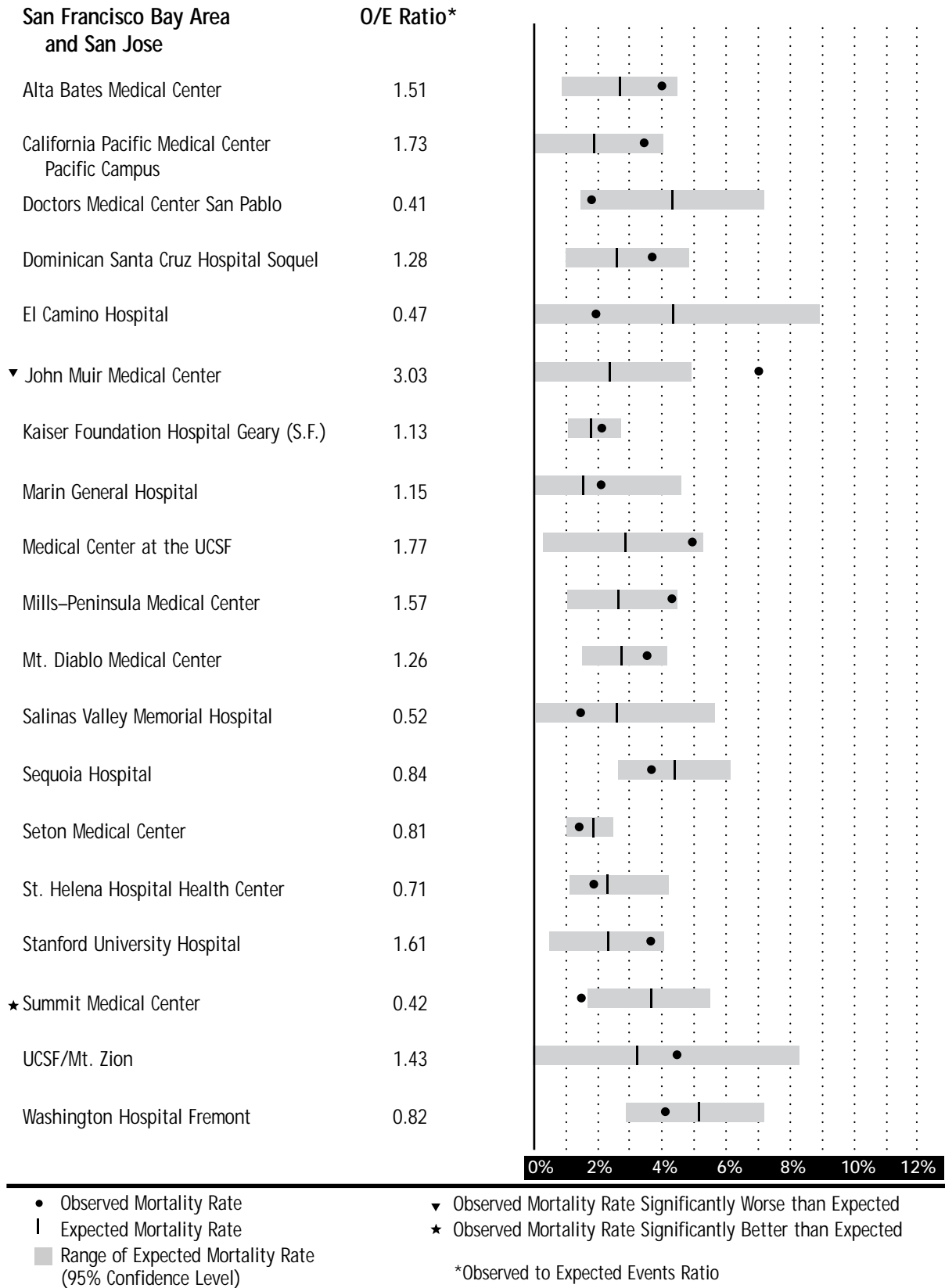
- Observed Mortality Rate
- | Expected Mortality Rate
- Range of Expected Mortality Rate (95% Confidence Level)

- ▼ Observed Mortality Rate Significantly Worse than Expected
- ★ Observed Mortality Rate Significantly Better than Expected

*Observed to Expected Events Ratio

NOTE: The following hospitals in this region declined to participate: N.T. Enloe Medical Center—Esplanade Campus

Figure 3 COMPARISON OF OBSERVED TO EXPECTED MORTALITY RATE, 1997 – 1998
(in Alphabetical Order by Geographic Region)



NOTE: The following hospitals in this region declined to participate: Columbia San Jose Medical Center, O'Connor Hospital, Queen of the Valley Hospital—Napa, Santa Clara Valley Medical Center, Santa Rosa Memorial Hospital, St. Mary's Medical Center—San Francisco, Columbia Good Samaritan Hospital

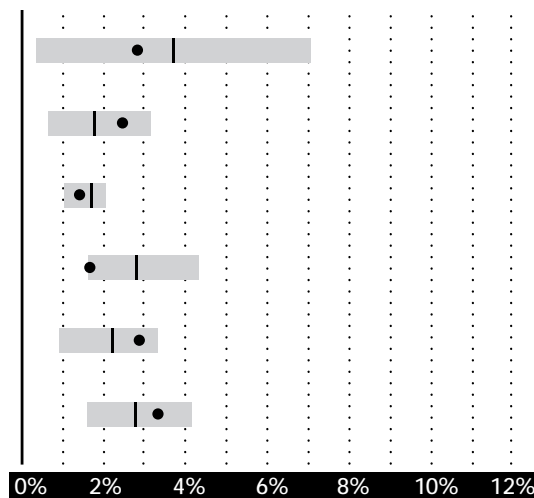
Figure 3 COMPARISON OF OBSERVED TO EXPECTED MORTALITY RATE, 1997 – 1998
(in Alphabetical Order by Geographic Region)

(cont.)

Central California

O/E Ratio*

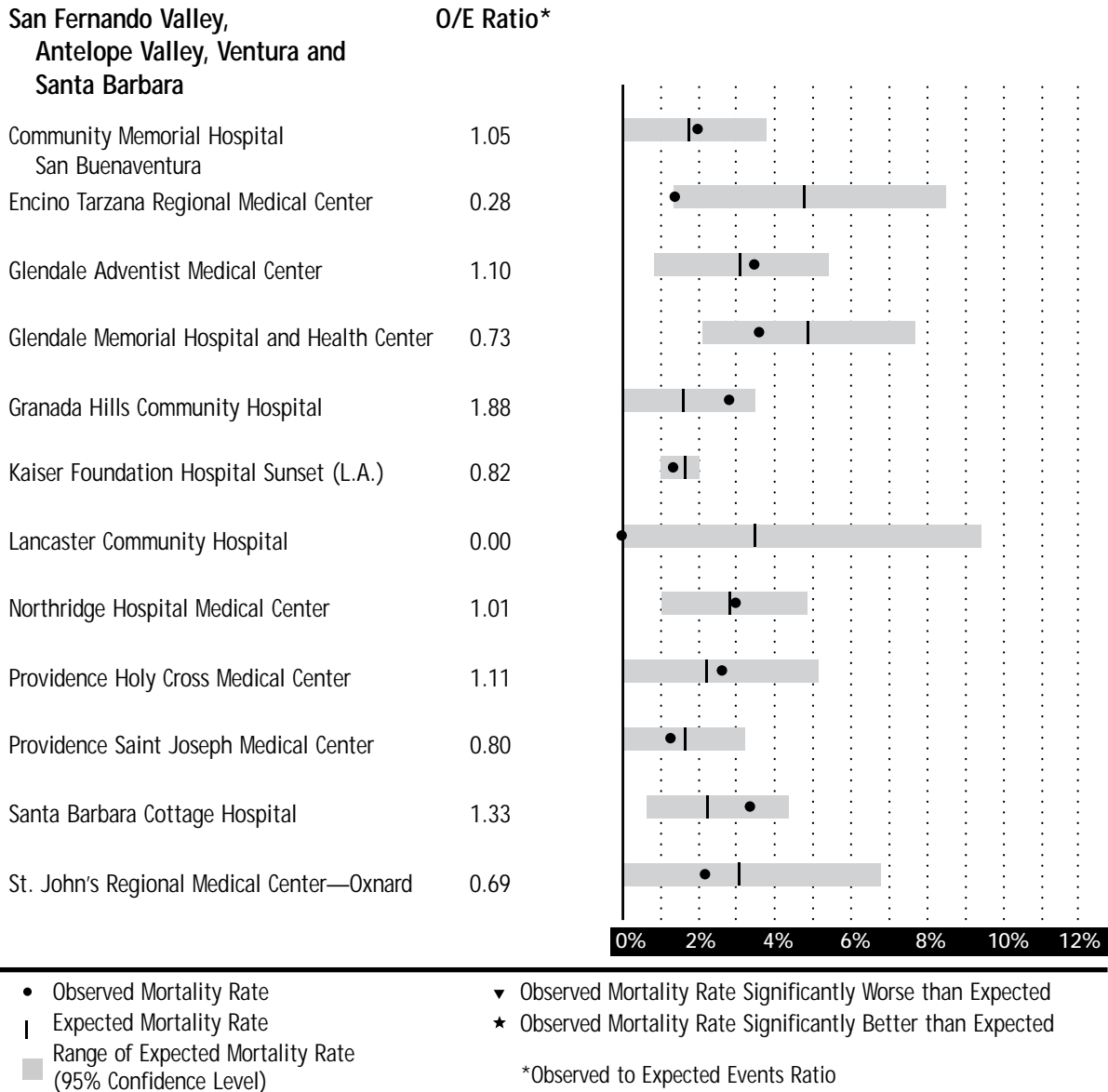
Dameron Hospital	0.76
Doctors Medical Center Modesto	1.34
Kaiser Foundation Hospital Sunset (L.A.)	0.82
Kaweah Delta District Hospital	0.55
Memorial Hospital Modesto	1.39
St. Joseph's Medical Center of Stockton	1.16



- Observed Mortality Rate
- | Expected Mortality Rate
- Range of Expected Mortality Rate (95% Confidence Level)
- ▼ Observed Mortality Rate Significantly Worse than Expected
- ★ Observed Mortality Rate Significantly Better than Expected
- *Observed to Expected Events Ratio

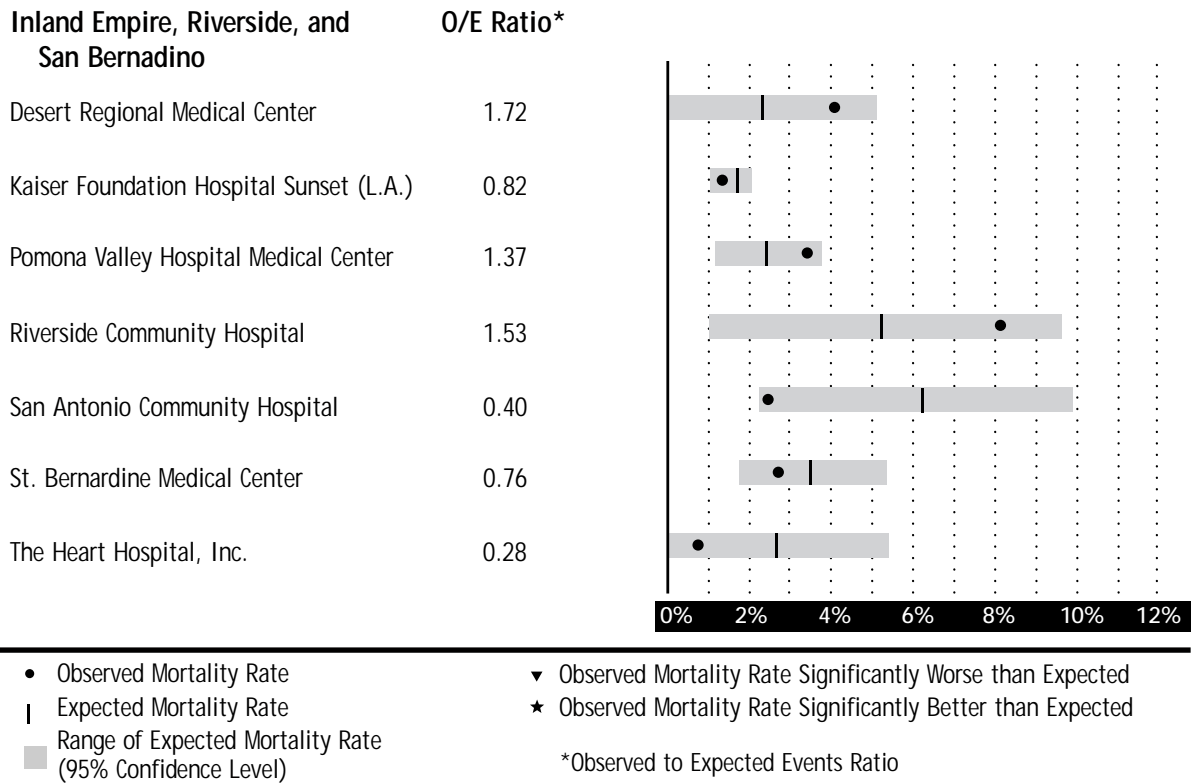
NOTE: The following hospitals in this region declined to participate: Bakersfield Memorial Hospital, Fresno Community Hospital and Medical Center, San Joaquin Community Hospital, St. Agnes Medical Center

Figure 3 COMPARISON OF OBSERVED TO EXPECTED MORTALITY RATE, 1997 – 1998
(in Alphabetical Order by Geographic Region)



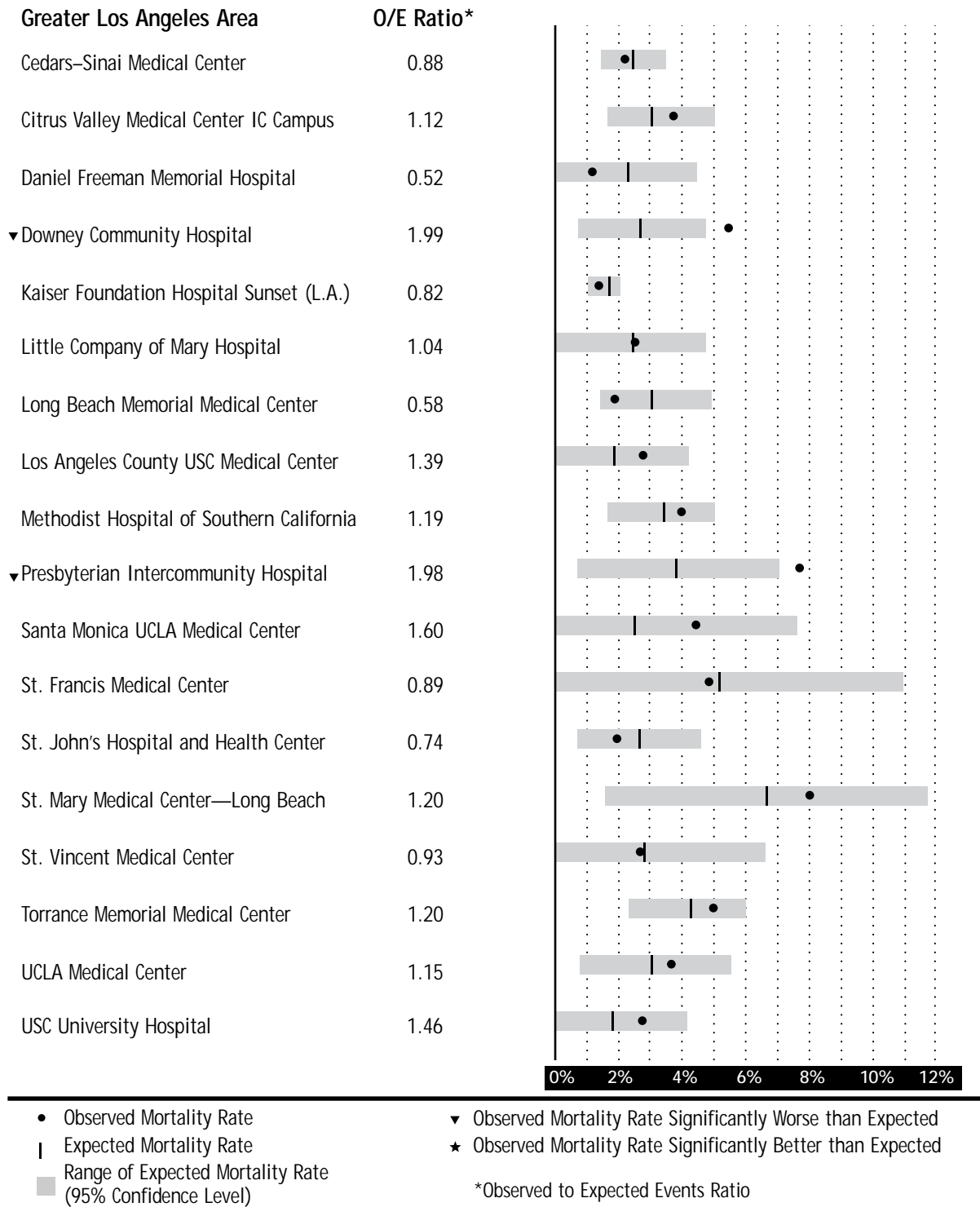
NOTE: The following hospitals in this region declined to participate: Antelope Valley Hospital Medical Center, Columbia Los Robles Hospital Medical Center, Columbia West Hills Medical Center, French Hospital—San Luis Obispo, Huntington Memorial Hospital, Marian Medical Center, Valley Presbyterian Hospital

Figure 3 COMPARISON OF OBSERVED TO EXPECTED MORTALITY RATE, 1997 – 1998
(in Alphabetical Order by Geographic Region)



NOTE: The following hospitals in this region declined to participate: Eisenhower Medical Center, Loma Linda University Medical Center, St. Mary Regional Medical Center—Apple Valley

Figure 3 COMPARISON OF OBSERVED TO EXPECTED MORTALITY RATE, 1997 – 1998
(in Alphabetical Order by Geographic Region)



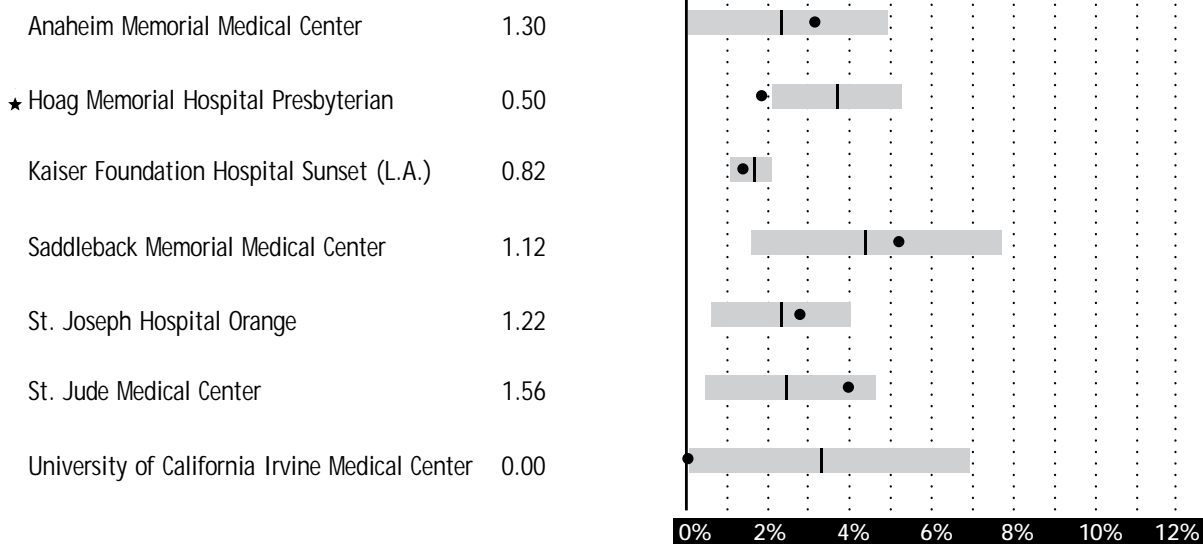
NOTE: The following hospitals in this region declined to participate: Beverly Hospital, Brotman Medical Center, Centinela Hospital Medical Center, Garfield Medical Center, Hospital of the Good Samaritan, Lakewood Regional Medical Center, Long Beach Community Medical Center, Los Angeles County Harbor—UCLA Medical Center, White Memorial Medical Center

Figure 3 COMPARISON OF OBSERVED TO EXPECTED MORTALITY RATE, 1997 – 1998
(in Alphabetical Order by Geographic Region)

(cont.)

Orange County

O/E Ratio*



- Observed Mortality Rate
- | Expected Mortality Rate
- Range of Expected Mortality Rate (95% Confidence Level)

- ▼ Observed Mortality Rate Significantly Worse than Expected
- ★ Observed Mortality Rate Significantly Better than Expected

*Observed to Expected Events Ratio

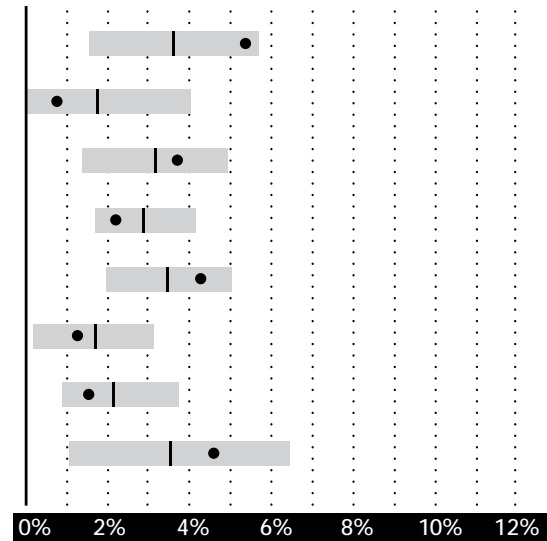
NOTE: The following hospitals in this region declined to participate: Fountain Valley Regional Hospital and Medical Center—Euclid, Mission Hospital Regional Medical Center, West Anaheim Medical Center, Western Medical Center—Anaheim, Western Medical Center—Santa Ana

Figure 3 COMPARISON OF OBSERVED TO EXPECTED MORTALITY RATE, 1997 – 1998
(in Alphabetical Order by Geographic Region)

San Diego Region

O/E Ratio*

Alvarado Hospital Medical Center	1.49
Sharp Grossmont Hospital	0.43
Palomar Medical Center	1.17
Scripps Memorial Hospital La Jolla	0.75
Sharp Chula Vista Medical Center	1.21
Sharp Memorial Hospital	0.76
Tri-City Medical Center	0.68
UC San Diego University Medical Center (Thornton and Hillcrest)	1.22



- Observed Mortality Rate
- | Expected Mortality Rate
- Range of Expected Mortality Rate (95% Confidence Level)

- ▼ Observed Mortality Rate Significantly Worse than Expected
- ★ Observed Mortality Rate Significantly Better than Expected

*Observed to Expected Events Ratio

NOTE: The following hospitals in this region declined to participate: Green Hospital of Scripps Clinic, Scripps Mercy Hospital

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